be as observed. He thus arrived at the theory of electromotive molecules which, with extraordinary insight and thoroughness, he worked out in its relations to all the electromotive phenomena of nerve and muscle when in the unexcited state. But, in doing this, he met with unexpected difficulties. So long as his observations were limited to the properties of the muscle cylinder the theory was applicable; a model could even be constructed of schematic molecules which displayed all the phenomena of the "cylinder" of living muscle; but in the natural muscle certain "parelectronomic" facts, to use du Bois-Reymond's word, presented themselves, which to this day are irreconcileable.

In connection with the molecular theory of the muscle current, he discovered the elementary facts relating to what is called stimulation or excitation, viz. that when a muscle is excited, whether naturally or artificially, the sudden shortening of its fibres is ushered in by still more sudden electrical changes. This phenomenon du Bois-Reymond succeeded in connecting with those of the muscle cylinder by means of the theory above referred to. According to his view, when a muscle is excited, each of its electromotive elements sustains a diminution of its E.M.F., the result of which is that in the muscle cylinder so excited the pre-existing difference between its cut-surface and its natural surface diminishes. Here again the progress of investigation has shown that while some of the electrical phenomena of excitation require such a theory for their explanation, it does not cover the whole ground; for which reason many physiologists decline to assign to it its true value.

A third theory of very wide application relates to the way in which electric currents when used as stimuli act on nerves. It was recognised by du Bois-Reymond that a voltaic current led through a nerve, although it produces those remarkable changes in its electromotive properties which are called electrotonic, fails to excite it to action so long as the current strength remains constant, but that the slightest increase or diminution of current strength excites it with an intensity which is inversely proportional to the time occupied by the change. Under certain conditions he found that his experimental results were in such strict conformity with the principle laid down as to justify their being embodied in a mathematical formula. But even here we now know that this "law of excitation" is not of universal application.

We have referred to these instances for the purpose of pointing out that du Bois-Reymond's real greatness consisted, not in his theories, but in the exactitude of his observations, the excellence of the methods which he devised, and the number of new relations which he discovered between physical and vital phenomena. Just as Ludwig taught us how to investigate the mechanics of the circulation, and Helmholtz how to determine the time-relations of physiological processes of very short duration, so du Bois-Reymond not only opened to us a new field of investigation, but furnished his contemporaries and successors with the means of cultivating it. For this service we can best show our gratitude by striving to work as he did, never allowing theory to influence our judgment in the interpretation of experimental data, and never contenting ourselves with inadequate methods of observation. In investigations of such difficulty mistakes are unavoidable, and it cannot be asserted that in his fifty years of active work du Bois-Reymond never fell into any errors of observation; but if we compare these with the new truths which he brought to light and established, their importance seems indeed trivial. There can be no more striking proof of the solidity of his achievements than the fact that, notwithstanding the large number of active workers who, during the last few decades, have been engaged in physiological researches, the instruments and methods which he devised are still in use. In every laboratory you find his "Schlitten inductorium," his non-polarisable electrodes, the du Bois key, and the du Bois compensator.

Like other great teachers, du Bois-Reymond founded a school; although his pupils were far from being as numerous as those of Ludwig, they occupy very important academical positions. The man who probably has done more to maintain the influence of his doctrines than any other is Prof. Bernstein, of Halle, whose "Untersuchung über den Erregungsvorgang," published in 1871, was comparable in importance to that of Hermann's research on muscle physiology, published a few years earlier. It is noteworthy that each of them dedicated his research to du Bois-Reymond—the one afterwards to become his energetic opponent, the other then and now his cordial supporter. If on any one the mantle of du Bois-Reymond falls, it must be on Bernstein.

J. BURDON-SANDERSON.

NOTES.

THE elevation of Sir Joseph Lister to the Peerage is a New Year's honour which has been received with the keenest satisfaction in the scientific world. It may be taken as an acknowledgment by the Crown of the high position of the President of the Royal Society, as well as a recognition of the life-long work in science which led to Sir Joseph Lister's selection for that honoured Presidency.

AN address of congratulation, signed by a number of eminent men of science, and by leaders in other branches of learning, has been presented to Mr. Herbert Spencer, in recognition of the successful completion of his "System of Synthetic Philosophy." With reference to this work it is remarked in the address: "Not all of us agreeing in equal measure with its conclusions, we are all at one in our estimate of the great intellectual powers it exhibits, and of the immense effect it has produced in the history of thought." The signatories requested Mr. Spencer to permit them to employ some eminent artist to take his portrait, with a view to its being deposited in one of the national collections. Though at one time averse to a proposal of this kind, Mr. Spencer has now given his consent in a letter to Sir Joseph Hooker, who forwarded the address, and Mr. Herkomer, R.A., has undertaken to paint the portrait. It is gratifying to know that the country will possess an authentic personal likeness of so distinguished a philosopher. Donations for the portrait fund may be sent to the Bank of England, Burlington Gardens, W.

THE distinguished Berlin astronomer, Prof. Dr. Arthur Auwers, has received from the German Emperor a gold medal for his services to science.

M. CALLANDREAU, professor of astronomy at the Paris École Polytechnique, has been elected a Correspondant of the St. Petersburg Academy of Sciences.

THE Council of the British Institute of Public Health have awarded the Harben medal for 1897 to Prof. M. von Pettenkofer, Emeritus Professor of Hygiene in the University of Munich.

IT is understood that Mr. Herbert Goss and the Rev. Canon Fowler, who have been joint Secretaries of the Entomological Society for the past eleven years, do not intend to offer themselves for re-election at the next annual meeting of the Society on the 20th inst.

WE regret to announce the deaths of Dr. Luigi Calori, professor of anatomy in Bologna University; Dr. G. D. E. Weyer, professor of mathematics and astronomy in the University of Kiel; M. Vivien de St. Martin, renowned for his researches in ancient geography; and Mr. Theodore Wormley, of Philadelphia, well known as a chemist.

M. GASTON TISSANDIER, who for the last quarter of a century has presided over the destinies of *La Nature*, has just retired from the editorship, and M. Henri de Parville has succeeded him. It is not proposed to make any changes in the character of the journal, and the traditions which have secured for *La Nature* a high degree of success and prosperity will be followed by the new editor.

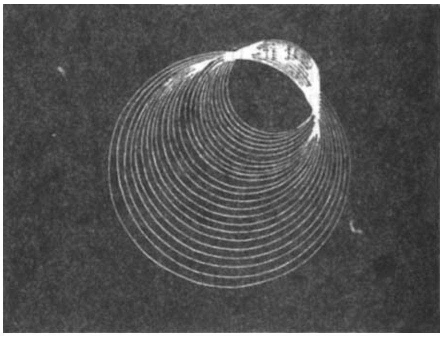
BY leaving almost the whole of his fortune to be converted into an international fund for the advancement of scientific research, the late M. Alfred Nobel performed an act for which his memory will be cherished in the world of science. According to the terms of the will, as reported by Reuter's correspondent at Stockholm, a fund is to be formed from all his realisable property, the yearly interest from which is to be divided into five equal portions. The first of these is to be allotted as a prize for the most important discovery in the domain of physics. The second is for the principal chemical discovery or improvement. The third is for the chief discovery in physiology or medicine. The fourth is for the most distinguished literary contribution in the same field; while the fifth is to be allotted to whomsoever may have achieved the most, or done the best to promote the cause of peace. All these prizes are open to Scandinavians and foreigners alike. After a few bequests to individuals have been deducted, it is expected that the fund thus devised will amount to the sum of 35,000,000 kroner, or nearly two millions sterling. The result of this very generous endowment to science will be an ever-growing monument to M. Nobel, built up of contributions to natural knowledge; a monument, too, which will stand out as a testimony of broad-mindedness and devotion to science. M. Nobel was cosmopolitan in more ways than one, for he was the master of seven or eight languages. He was a Swede by birth, having been born at Stockholm in 1833. A very appreciative article in the *Ardrossan and Saltcoats Herald* of December 25, evidently written with authority, contains a list of his researches and inventions, and some interesting notes on his personal characteristics. M. Nobel was educated at St. Petersburg, and subsequently assisted his father in his engineering shops at Stockholm, and was little over thirty years of age when he became identified largely with explosives. On May 7, 1867, he published his great "Dynamite, or Nobel's Safety Powder" paper, which inaugurated a new era in the entire world of explosives, and in many branches of engineering. His blasting gelatine patent followed in 1875; and the invention of Ballistite, a smokeless propelling powder, was patented in 1888. M. Nobel was never married.

WE are glad to announce another gift to science. The Paris correspondent of the *Times* states that the widow of Baron Maurice Hirsch, of Vienna, has resolved to present 2,000,000 francs to the Pasteur Institute as a memorial of her husband. This will enable the building to be enlarged by chemical and biological laboratories, which, it is estimated, will cost 800,000 francs. Some of the professors, moreover, at present receive little or no salary. The gift comes at a very appropriate time, and it could not have been bestowed upon a worthier object, nor could a better memorial be found, than the Pasteur Institute.

THE twenty-fourth annual dinner of the old students of the Royal School of Mines will be held at seven o'clock on Tuesday, January 26, at the Criterion Restaurant. The chair will be taken by Dr. T. K. Rose. Tickets may be obtained from Mr. H. G. Graves, 5 Robert Street, Adelphi, W.C.

QUITE recently a considerable number of additions to our knowledge of the Röntgen rays and their applications have been published. From Prof. Hobday we have just received a reprint of his and Mr. V. E. Johnson's joint paper in the *Veterinarian* for September, dealing with the use of these rays in veterinary practice, illustrated by several excellent radiographs of the hoof and hock of horses, both normal and abnormal. In the *Bulletin* of the Belgian Royal Academy, M. L. N. Vandevyver enunciates the empirical law that the length of exposure for radiographs through limbs of different dimensions varies as the cube of their thickness, and the illustrations which accompany the paper afford ample corroboration of the law from a practical point of view. The *Journal of the Camera Club* for December contains the account of a lecture, by Prof. Rücker, on the transparency of glass and porcelain to these rays, from which it appears that the presence of phosphates in china is indicated by their greater opacity, a result which might naturally be expected to follow from the considerable opacity of bone to Röntgen rays. M. Bouchard, in a communication to the Paris Académie des Sciences, states that Röntgen rays can be successfully employed in diagnosing pleurisy and similar complaints.

A CURIOUS optical phenomenon is exhibited by the accompanying tracing, made by a finely-pointed top spinning on a plate of glass covered by a light coat of lampblack, and sent to us by Dr. C. B. Warring. If the spiral is looked at with either eye, the other being closed, one seems to see the inside of a hollow truncated cone, the smaller base being farthermost; or else only the outside will be seen, the smaller base being apparently nearest. If the eyes be opened and closed alternately, the image may appear to each in the same position, perhaps for half-a-dozen alternations, and then, without apparent cause, reverse, or it may reverse for one eye and not for the other. If both eyes be opened, only one image may appear, sometimes in one position and sometimes in the other. The principle seems to be the same as that which applies to a polished hemisphere laid on a plane surface, and looked at from a little distance.



AT a meeting of the Société Française de Physique, on December 4, M. Jean Perrin described his investigations on the dissociation of neutral electricity produced in gases by Röntgen rays, to which their power of discharging insulated conductors is due. At constant temperature the quantity of dissociated electricity per unit volume is *cæteris paribus* proportional to the pressure, and hence to the density of the gas. At constant pressure it is independent of the temperature, and since the density is inversely proportional to the absolute temperature, it follows that the quantity dissociated per unit mass is independent of the pressure, and varies as the absolute temperature. At the same meeting, M. Broca made some interesting statements about the baldness produced by Röntgen rays, which is caused by the hairs falling off with the skin. The scars are sometimes not produced till three weeks after the skin was exposed to the rays, and where the cuticle is replaced by cicatrised tissue the hairs disappear; but they grow up again everywhere else, so that the rays cannot be used for depilatory purposes.

The influence of light upon the discharge of electrified bodies has formed the subject of many investigations since Hertz observed the effect of ultra-violet light upon the spark of an induction coil, less than ten years ago. Since then an extensive literature of the subject has grown up, though only a few of the more important papers are in English; so it is difficult to determine how far the knowledge of the phenomenon has progressed. For this reason, and in view of the evident importance of the subject, Mr. Ernest Merritt has prepared an account of the investigations which have thus far been published; his very useful summary appearing in *Science* of December 11 and December 18, 1896. It appears from this account that a thoroughly satisfactory explanation of the discharging action of light has not yet been found, and that many questions concerning the phenomenon remain to be settled by further experimental investigation.

The January number of *Science Progress* opens with an article, by Prof. H. A. Miers, F.R.S., on Dr. Lehmann's "Liquid Crystals." Two of these remarkable bodies are azoxyphenol and azoxyanisol. When crystals of azoxyphenol are warmed on a microscopic slide, they are suddenly transformed, at a temperature of 134°, into a substance which preserves the outline of the crystal, is strikingly doubly-refractive, and behaves like a true crystal when rotated between crossed Nicols, but is nevertheless a liquid. If the preparation be still further warmed, it passes at 165° into a third modification which is also liquid, but not doubly-refractive. It is possible to contrive that this molten substance shall contain small portions of the first, birefringent, liquid which float about in it as perfectly spherical drops, and are regarded by Lehmann as really liquid crystals. Crystals of azoxyphenol behave in a similar way, the changes taking place at 116° and 134°. The investigation of these curious birefringent liquids has an important bearing upon current views regarding the structure of solids and liquids.

Balmokand, a cloth-seller of Rawalpindi, has written a remarkable brochure, entitled "The Priceless Gem" (The Mitra Vilasa Press, Lahore), which advocates what may be regarded as a "puritanical" movement in modern Hinduism. It would be easy to indite a cheap criticism of the literary style, the authorities quoted, and of the translation from the original Urdu into "baboo" English, but it is a more grateful task to recognise and make known the serious aim of the author. Being struck by the contrast between the former learning, wealth and power of ancient India, and her present "ignorance, indolence, indulgence . . . with all other vices and evils," Balmokand, by "long contemplation and continuous thought," came to the conclusion that this is due to disregard of the ancient *Baran* custom; by which a man and woman of similar *baran* being joined in marriage "should become for their whole life a loving and affectionate couple." The author waxes eloquent on the joys of a happy marriage, and on the chivalrous protection, courtesy and deference that is due to woman from man, and sustains his position by quotations from the Hindu sacred writings. He is also strong on the crime of infant-marriage, and relies on ancient authority for maintaining that neither sex should marry before the twenty-fifth or twenty-sixth year. Most of the ills of modern India are ascribed to the breaking up into innumerable castes of the four primitive *barans*—Brahmin, Kshatrya, Vaisha and Sudra. The psychological and religious tendencies of the members of the four *barans* are described, and the decadent social groups produced by various degrees of miscegenation are detailed. The four primitive castes were communities of relationship; he would resuscitate the classes, but would admit entrance into them by the casting of a horoscope. The selection of suitable partners in life is rightly regarded as a most important matter which affects family happiness and the well-being of the next generation; this selection is, however, not to be made by wise consideration in the European sense of the term, but, like all the other events of life, is to be determined by divination. The main interest of the pamphlet lies in the picture that it gives of the working of the mind of an enthusiast and visionary belonging to an entirely different world from our own; it is a practical lesson in comparative psychology.

A grave-find at Vitzke, in Altmark, probably belonging to about the end of the fourth century of our era, is described and figured by E. Krause in *Globus* (Band lxx. Nr. 17). In the same number of the journal is the annotated translation (in German) of the Polynesian song of the saving of Nga-Upoko-E-Rua, the daughter of Potikitanas, in which are embodied myths of origin. Dr. A. Vierkandt follows with a sociological study on the family. The succeeding number of *Globus* has an illustrated article showing the skill in portraiture of the ancient Egyptian sculptors. P. Dittrich contributes a study of the plans of houses and of rudimentary courtyards in Schlesien. Schlesien was originally a German land; during the wandering of the peoples it was peopled by Slavs, but later, especially in the west, German influence made itself felt. It is not too soon that such investigations have been undertaken, for the thrashing-machine is replacing the flail, and gradually the history of the old culture will become obliterated. Would that we had such investigations in our own islands!

Some experiments have been made by Wernicke on the vitality of cholera vibrios under particularly interesting conditions. A model aquarium was constructed, and in it water-weeds of all descriptions were planted; it was supplied with fish, and there was no lack of ordinary water bacteria, in addition to which about five milliards of cholera germs were introduced. The vessel and its contents stood in the laboratory, and was exposed to both diffused light as well as to direct sunshine. Nearly three months after the cholera vibrios had been added, they could be detected in the water, as also on the water-weeds; whilst even after the lapse of three months they were isolated from the mud at the bottom. Later, however, all traces of them disappeared. Wernicke is of opinion that mud affords a very suitable nidus for the preservation of cholera vibrios, and believes that, had he allowed less light to gain access to his glass vessel and its contents, he would have identified them even longer; doubtless in the beds of rivers they would preserve their vitality for a considerably longer period. No alteration, either in their morphological or biological functions, could be traced in these cholera vibrios in consequence of their surroundings; but whilst Wernicke states that they were highly virulent when they were first introduced, he unfortunately omits to say if their pathogenic properties suffered any diminution in the interval.

"The principal household insects of the United States" are described by L. O. Howard and C. L. Marlatt in *Bulletin* No. 4, published by the United States Department of Agriculture. The work contains numerous original observations, and will interest the European reader by giving him a clear and trustworthy account of some of the insect pests which infest houses in the Southern States of America. Among the insects which are equally well known in Europe and America is the bed-bug, which Prof. Marlatt informs us was said by Kalm in 1748 to be plentiful in the English colonies and in Canada, though unknown among the Indians. We believe there is evidence of its having been abundant in Jamaica early in the last century. Prof. Marlatt thinks that the irritation caused by its attacks is due simply to the puncture, and that no poison is injected; but this is certainly an open question, and requires further investigation. A far more formidable insect, however, is *Conorhinus sanguisuga*, Leconte, called by

Marlatt "the blood-sucking cone-nose," a near ally of the well-known Chilian Bug, *C. Renggeri*, and very similar in its habits, attacking insects and vertebrate animals almost indiscriminately. It belongs to the same family as our Wheel Bug (*Reduvius personatus*), and, like the latter insect, is common in outhouses, and will, on occasion, feed on the common bed-bug. Our insect, however, is much smaller, and rarely attacks man. American houses are also commonly infested by a curious long-legged centipede, *Scutigera forceps*, belonging to a family represented in South Europe, though not in England. However, it only seems to bite in self-defence, and is therefore a less objectionable visitor than might be supposed. White ants, which have, happily, not yet effected a lodgment in England, are as destructive in America as in many other parts of the world; but are too well known to need special notice here. Much more interesting matter will be found in this important little *Bulletin*.

"VERITYS' Conversion Table" (designed by Mr. M. B. Cotterell) shows graphically the prices of wire and cable per yard, coil, or mile. By means of this simple diagram, it is easy to find the price per coil and per yard of a cable quoted at any price per mile. Every maker of electrical fittings should hang up a copy of the diagram in his office, for as a ready reckoner it will prove very serviceable.

A THIRD edition of "Our Secret Friends and Foes," by Dr. Percy Frankland, F.R.S., published in the S.P.C.K. Romance of Science Series, is now in the press, and will shortly be issued. A new chapter has been added, in which diphtheria-antitoxin is dealt with, as well as Calmette's investigations on snake poisons and their treatment by anti-venomous serum. Dr. Nobbe's recent researches on root-nodule bacteria are described in detail, whilst milk-bacteriology in its latest developments is also enlarged upon.

UNDER the editorship of Dr. J. H. Bechhold, a new German weekly journal—*Die Umschau*—has made its appearance. It is proposed to survey the developments and advances of pure and applied science, literature and art, by interesting articles and notes. The first number of the new periodical contains among the articles, "Völkerkunde," by Dr. Max Buchner; "Die Physik der Himmelskörper," by Dr. Huggins, put into German by Marie Bechhold; and "Die Heimat der Germanen," by Dr. J. W. Bruinier.

TWO considerable additions have recently been made to the literature of limnology. In the *Mittheilungen der k.k. Geographischen Gesellschaft* of Vienna, Herr Eberhard Fugger publishes a paper on mountain lakes, which is for the most part a summing-up of conclusions based on extensive observations made on the lakes of Salzburg and the High Tauern during 1891, 1893, and 1895. The causes of origin of such basins are discussed in detail, and their life-history traced through various stages either of continued extension by erosive action, or of gradual filling up. The typical rock-basin is to be regarded as an interruption of the work of forming a valley.

IN the above-named journal Dr. K. Peuker draws attention to the work of Dr. W. Halbfass on the lakes of Northern Germany, especially the Arendsee and the lakes of the Elbe basin. The Arendsee is found to be the deepest lake known in Northern Germany, its mean depth from 1200 soundings being 29·3 metres, and greatest depth 49·5 metres. The extreme concavity of the basin serves to account for remarkable variations in the temperature of the water.

THE ninth edition of the list of vertebrated animals now or lately living in the Gardens of the Zoological Society of London has just been published by the Society. It constitutes "a nearly complete catalogue of all the species of vertebrates of which specimens have been exhibited in the Society's menagerie during the past thirty-four years." The first edition of the list was issued in 1862, and it contained 100 pages and comprised 682 species. The present edition runs into more than 700 pages, and contains references to 3044 species, 770 of which are mammals, 1676 birds, 420 reptiles, 80 batrachians, and 98 fishes. There are also seventy woodcuts in the volume. The list is of service not merely as an indication of the animals which have been kept in the Society's Gardens, but also for references to descriptions of them.

WE have received from Prof. Sresnevsky, Director of Dorpat Observatory, an excerpt paper upon the greater oscillations of barometric pressure during the year 1887. The investigation has been undertaken in the interest of weather prediction. It is well known that successful weather forecasting depends chiefly upon the prediction of the direction which the centre of an atmospheric disturbance will follow. There are various indications which sometimes allow of the determination of this path, but many of the rules are of an empirical nature. The author has investigated these indications by means of the observations published in the Russian Weather Reports, and has embodied the results at which he has arrived in a useful communication to the *Bulletin* of the Imperial Society of Naturalists of Moscow.

THE Government Observatory, Bombay, has just issued its thirty-fourth volume, containing the results of the magnetical and meteorological observations for the year 1895. This institution has kept up an uninterrupted record of systematic and trustworthy magnetic and meteorological observations for the last fifty years, and the results are condensed in a valuable appendix to the present volume. The maximum temperature recorded during this period was 100·2° in 1857, and the minimum 53·3° in 1847. The average yearly rainfall is 72·44 inches, and the annual values vary from about 41 inches to 115 inches. The maximum fall in one day amounted to 16 inches, in June 1886. The Observatory owes much of its present reputation to the valuable contributions in terrestrial magnetism and meteorology of Mr. Charles Chambers, the late Director. We notice that, with the exception of Mr. Moos, the present Director, the staff is composed of native assistants.

THE General Report on the operations of the Survey of India during the year ending with September 1895, has just been received. In this period the aggregate area surveyed on all scales amounts to 125,384 miles, exclusive of 5018 square miles embraced by traverse operations in the Central Provinces and the North-western Provinces and Oudh. In the trigonometrical surveys, the Upper Burma principal triangulation was carried northwards as well as westwards through Manipur and Assam. In addition to the topographical work accomplished during the year, a detachment with the Pamir Commission surveyed 250 square miles, and one with the Chitral Relief Force surveyed in detail 450 square miles on the 1-inch scale, 215 square miles on the $\frac{1}{2}$-inch scale, and, approximately, 1900 square miles on the $\frac{1}{4}$-inch scale. The results of the operations of the latter surveyors is that considerable knowledge of the topography has been gained of an area of 3600 square miles of a country previously practically unknown, and much credit is due to Captain Bythell and the men who served under him for such a satisfactory record of work. Two views, representing the Malakand Pass and the Chitral bridge and fort, have been reproduced by heliogravure to illustrate Captain Bythell's report. A mass of information on the forest survey operations, cadastral surveys, traverse surveys, longitude observations, geographical surveys and reconnaissances, carried out by the Survey Department under the direction of Colonel C. Strahan, R.E., Surveyor-General of India, is included in the General Report.

SEVERAL Bibliographies, lately received, show that serious and increased attention is being given to the organisation of scientific literature. One admirable and very useful work of this kind is a "Catalogue des Bibliographies Géologiques," prepared under the direction of M. Emm. de Margerie, Secretary of the Commission Internationale de Bibliographie Géologique, in conformity with a vote taken during the International Congress at Washington in 1891. The volume is chiefly made up of descriptive lists of publications arranged according to regions, those in each region being in turn classified according to subjects and authors. The contents fill 732 pages. The work is primarily intended for distribution among members of the Geological Congress; so only a few copies are for sale, these being obtainable from either Messrs. Dulau or Messrs. Friedländer. As expressed by the title, it is not a bibliography of geology, but a bibliography of geological bibliographies, using this latter designation in its widest sense. The volume may thus be regarded as the key to geological literature, and it will doubtless prove of great service as the means by which geologists will be able to unlock their stores of knowledge.—The second volume of the "Bibliotheca Geographica," prepared by Herr Otto Baschin, and issued by the Gesellschaft für Erdkunde zu Berlin, has also come to hand. The plan of the work, which refers to the geographical publications of the year 1893, is the same as that of the first volume, except for a few minor changes in the system of classification; but while the previous volume contained 13,800 entries for the years 1891 and 1892, the present has over 10,000 for 1893 alone. Herr Baschin invites the authors of geographical papers published in journals, and in Transactions not restricted to that branch of science, to forward full titles and references to him at "Schinkelplatz 6, Berlin, W."—A répertoire of physiological works published in 1895, has been prepared by Prof. Ch. Richet. In this "Bibliographia Physiologica" (Paris: Felix Alcan) the publications are classified according to Dewey's decimal system, and Prof. Richet urges authors to give their papers numbers based upon this plan. It is proposed to publish very shortly similar bibliographies of physiology for 1893 and 1894. The first part of the bibliography for 1896 was received a few days ago. Authors are requested to send copies of memoirs on physiological subjects to Prof. Ch. Richet, Faculté de médecine de Paris, and so assist to make his catalogues as complete as possible.

THE additions to the Zoological Society's Gardens during the past week include a West African Love Bird (*Agapornis pullaria*) from West Africa, presented by Miss E. M. Tuely; eight Grooved Tortoises (*Testudo calcarata*) from South Africa, a Bearded Lizard (*Amphibolurus barbatus*), seven —— Lizards (*Amphibolurus*, sp. inc.), two Great Cyclodus (*Tiliqua gigas*), six Lesueur's Water Lizards (*Physignathus lesueuri*), a Death Adder (*Acanthopis antarcticus*), a Purplish Death Adder (*Pseudechis porphyriacus*), a Short Death Adder (*Brachyaspis curta*), three Brown Death Adders (*Diemenia textilis*) from Australia, deposited.

OUR ASTRONOMICAL COLUMN.

THE TOTAL SOLAR ECLIPSE OF AUGUST 9, 1896.—M. Deslandres, who was commissioned by the Bureau des Longitudes to proceed to Japan and make observations of the total solar eclipse visible there on August 9 last year, gives in *La Nature* for December 26 a short account of the expedition in general and a brief description of the results obtained. The station decided upon was the small port known as Yesashi, on the northern side of the island of Yézo, where the Japanese party under Prof. Terao and the American expedition were eventually located. During their stay of six weeks there were only eight fine days, so that the previous meteorological reports, which indicated the bad climatic conditions of the island at this season, were entirely corroborated. As we all know, the sky was cloudy during the time of totality, but the French party was more fortunate than the Norwegian observers, for their clouds were evidently not so dense as those which obscured the sun at Vadsö and Kiö. M. Deslandres, who was directing the observers under him, saw at a glance that it was useless to proceed in the programme previously arranged for under fine weather conditions. He therefore gave instructions that in the different instruments a single sensitive plate should be exposed for the entire duration of totality. Of the plates exposed, six showed the corona "plus ou moins fort," while on the remainder nothing was seen after development. The negatives indicated dim extensions in the north-west, north-east, and south-west directions, but practically only the general distribution of the coronal light was shown. The images of Venus and Jupiter were also found recorded on two of the negatives. The eclipse of 1896, as M. Deslandres says, confirms the following law, indicated already to a certain extent in previous eclipses, namely, that the periodical variations of the spots which are followed by the prominences extend to the corona, and therefore also to the entire solar atmosphere.

THE MELBOURNE OBSERVATORY.—The thirtieth report (May 1895–June 1896) of the Board of Visitors to the Melbourne Observatory, shows that since the large reduction of the staff which has taken place during the last two or three years, the work of the observatory has had to be necessarily limited. Mr. Baracchi, who is the acting astronomer, has nevertheless been able to cope with the existing circumstances and carry on, at any rate, the most important work and supply the local requirements for meteorological statistics and other scientific matters. Reference is also made in this report to the existence of a large amount of valuable work which is yet unpublished. Besides over thirty years' records in terrestrial magnetism and valuable investigations bearing on the climate of the colony, there is the important work of measurement of the photographic plates of southern zone stars, which is the Melbourne portion of the great international undertaking of the photographic chart of the heavens. There seems also to be a great mass of material unpublished concerning the work done with the great reflector; this consists, as we are told, of finished drawings of nebulæ, sketches, notes, and micrometric measurements "only a minute portion of which has been published." It is sad to read that "observations with the great telescope and other equatorials must for the present be abandoned, and that even if the extra assistance asked for be granted, we shall only be able to barely fulfil already accepted obligations." Perhaps some public-spirited person will offer financial aid to tide over the present difficulties.

MISTS ON MARS.—A circular from Kiel, dated December 27, reports the following information received from M. Flammarion:—"M. Flammarion announces mists (brouillards) on Mars extending to various distances round the polar cap. This whitish zone, less brilliant than the polar snow, extends to a great distance from the pole, and finally vanishes. One might easily mistake it for an extension of the polar cap itself, and this is what has occurred in old observations. M. Antoniadi has made some accurate measurements at Juvisy."

THE ATMOSPHERIC ABSORPTION OF LIGHT.

IT is well known that there are some circumstances, connected with photometric observations, calculated to make us doubt whether, theoretically or observationally, we have determined correctly the amount of light that is extinguished in its passage through our atmosphere. Foremost amongst these considerations may be mentioned the fact, pointed out some time since by Prof. Seeliger, that the very accurate and trustworthy observations made by Dr. Müller, at Potsdam, with a view to determine this quantity, are not rigorously represented by the theoretical expressions derived by Laplace. The deviations may not be large in amount, but they exhibit a systematic character which is suspicious. In the same connection may be mentioned the initial objection, urged by Prof. Langley, that the fundamental expressions used in those investigations are not equally applicable to light of all wave-lengths. There are, further, in use different numerical values of the coefficient of transmission, pointing either to various degrees of transparency in the atmosphere, or to peculiarities in the instruments themselves, or the methods employed in the reduction of the observations.